Anatomical Structure of Reproductive Organs of Chickens in the Egg Direction

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ANNOTATION

This article provides information based on the analysis of the literature on the anatomical structure of the reproductive organs (oviduct, funnel, protein section and isthmus of the oviduct) of laying hens in postnatal ontogenesis.

KEYWORDS: *reproductive, avian, morphological, poultry, ovarian, functional, ovarian, epithelial, ventral, dorsal, proteinaceous.*

Relevance of the topic: Poultry is one of the most efficient, highly profitable and promising sectors of animal husbandry, as it is not seasonal, unlike other industries, and plays a leading role in providing food to the population throughout the year. Therefore, one of the main tasks in improving selection and breeding is to study the functional morphology of birds. Knowledge of the age-related structural and functional characteristics of reproduction is also needed to develop theoretical generalizations of the age morphology of the reproductive organs, to increase productivity, increase the number of herds and timely differential diagnosis of reproductive diseases, to solve practical problems is necessary. The reproductive organs of chickens include the oviduct and ovaries.

The oviduct is a tubular organ in which the egg matures and attaches, the formation of tertiary egg membranes (protein, epithelial membranes, cortex, subcortical membranes), and the early stages of embryonic development. The oviduct is located on the left side of the abdomen and hangs from the fourth rib to the cloaca in the ventral and dorsal ligaments. The oviduct is innervated by the autonomic nervous system. The branches of the sympathetic nerves travel from the ovary to the oviduct and some other glands. Parasympathetic innervation is mainly provided by the internal nerve of the pelvic cavity [1].

According to the morphological features and physiological functions of the oviduct, it is divided into five parts: the funnel, the protein part, the cervix, the uterus and the vagina [7].

Before laying eggs, the length of the oviduct is 10-20 sm and the diameter is 0.3-0.8 sm. After reaching the age of maturity, it reaches a length of 40-60 sm and a diameter of 10 sm [2].

When ovulation stops, the length of the oviduct is reduced and the boundaries between the ovaries are smoothed [10].

In sexually mature birds, the walls of the oviduct are made up of mucous, muscular, and serous membranes [16].

The mucous membrane of the oviduct is composed of a covering epithelium and a special plate made of porous connective tissue. In the covering epithelium there are ciliated and goblet cells. The upper part of a mucous layer consists of folds. The submucosal layer is underdeveloped.

The muscular layer is represented by a set of smooth muscles, which consist of two layers: the inner - annular, the outer - longitudinal. They thicken in the caudal direction (there). The serous membrane is composed of a thin layer of connective tissue covered by a single layer of squamous epithelium.

The walls of the funnel's mouth are thin and slightly bulging, forming lips and attached to the abdominal wall by muscle fibers. Because of these connections, the funnel moves back and forth, pulling the egg out of the yolk sac after ovulation [5].

The blood supply to the ovaries is provided by the ovaries, flanks and internal arteries. The anterior, middle, and posterior ovarian arteries branch off. They enter the oviduct at different levels and branch into its wall, after which they collect in several veins, which emerge from different parts of the oviduct [12].

The funnel is the anterior part of the oviduct that opens into the broad bell-shaped ovary. Based on their morphofunctional characteristics, they are divided into a special funnel and its neck. The funnel itself is thin-walled, conical, open to the ovary. Its diameter is about 8-9 sm. The length of the funnel varies from 4 sm to 14 sm. [4].

The 5-month-old Leggorn hens lay an oviduct funnel 7.0 sm in diameter, 9.0 sm long, weigh 2.5 g, have folds 14–60 mkm high and 45 mkm wide [8].

The edges of the funnel are covered with bachroma-fimbriae. The mucous membrane forms small irregular folds without glands. The enlarged part of the funnel passes into a narrower tube - the neck of the funnel, which is about 2-4 sm long [13].

The mucous membrane of the funnel contains longitudinal folds, which form small secondary folds, the mucous layer of which is covered with ciliated cubic or cylindrical epithelium [1].

At the base of the folds open simple tubular glands, which are covered with a cubic epithelium [14].

The muscle layer is not clearly divided. The muscular membrane is well defined, the circular layer is denser, and its specific volume is larger than that of the longitudinal layer. The circulatory layer of the musculature is denser, with clusters of myocytes intertwined. In 6-month-old hens, the thickness of the muscle membrane is 161.9 mkm, while at 12 months it is significantly reduced. This is mainly due to changes in the thickness of the special plate and the functional state of the genital tract of chickens. However, other authors suggest that the number of longitudinal folds is 20-25, with a height of -1500 microns, a width of 140 microns and a height of the covering epithelium of 8 microns [3].

The protein part is the longest and widest part of the oviduct, where the egg white is formed. The length of the protein fraction varies from 25 cm to 40 cm [1, 4].

In 5-month-old white hens, the protein section is 15.0 cm long and weighs 20.0 g [7].

The covering epithelium consists of three types - ciliated, goblet and protein-secreting cells [6].

Numerous glands with branched ends open at the base and sides of the folds of the mucous membrane of the protein compartment. They are very deep, so the special plate of the mucous membrane is almost invisible in laying hens. The glandular epithelium is single-layered, columnar [15].

In the egg-laying hens, there are two types of glandular proteins: tubular and single-celled. Along the oviduct, the egg's outer membranes are formed. Its length varies from 8 cm to 12 cm, according to various sources. [1, 5]

The diameter of the neck of the oviduct is small and not long, but is characterized by the thickness of the annular muscles. It is very similar to a protein in appearance and histological structure. [10]

The folds of the cervical mucosa are lateral to the protein layer and are lower (up to 4 mm) and thinner to 1.5 mm. [1]

Leggorn 5-month-old hens have a length of 9.0 cm along the oviduct, weight - 5.0 g, height of folds - 600 microns, width - 150 microns and height of the covering epithelium - 6 microns. [9]

Conclusion. In the study of the anatomical structure of the reproductive organs of chickens, the literature data showed that there are significant gaps in scientific knowledge about the ontogenesis of reproductive organs, there is no modern periodicity of development of these organs, important stages of genital formation are not identified. No mechanisms have been established to differentiate the ovaries and oviducts of chickens in the ovary. This serves as the basis for the study of the reproductive organs of egg-laying hens in postnatal ontogeny and is of great theoretical importance for age-related morphology and reproductive biology.

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